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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,133	09/30/2003	Kurt Raichle	87355.4120	3829

7590 12/27/2004

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EXAMINER
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SAINT SURIN, JACQUES M

ART UNIT	PAPER NUMBER
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2856

DATE MAILED: 12/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/673,133

Applicant(s)

RAICHLE, KURT

Examiner

Jacques M Saint-Surin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 3.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11-15, 17, 18, 21-24, 27 and 28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-8, 11-15, 21, 23-24 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuboi (US Patent 5,144,838).

Regarding claims 1, 11, 17 and 23, Tsuboi discloses a system (defect detecting method and apparatus of Fig. 9) for analyzing a vibration frequency in a vehicle having a defect, the system comprising:

a sensor (sensor 27 as shown in Fig. 9) to sense the vibration frequency, wherein the sensor (27) generates a signal in response to the vibration frequency (vibration unit 25); and

a signal spectrum analyzer (spectrum analysis means 37 as shown in Fig. 9) in communication with the sensor (27), wherein the signal spectrum analyzer identifies the defect in response to the signal (a signal processor for analyzing a spectrum of a characteristic vibration of the object to be measured and for determining whether the defect is present or absent, see; col. 2, lines 34-45).

Regarding claims 2 and 12, Tsuboi shows a frequency selector (window W1 generation means shown in Fig. 9) in communication with the sensor (27) and

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configured to select a frequency component having a relative maximum amplitude from a plurality of frequency components of the vibration frequency.

Regarding claims 3 and 13, Tsuboi discloses a signal filter (signal conditioner 28, as shown in Fig. 9) for filtering the signal.

Regarding claims 4 and 14, Tsuboi discloses a programmable gate device (gate means 31 as shown in Fig. 9) for controlling the filter (28).

Regarding claim 5, Tsuboi discloses a microprocessor (the computation process and determination unit 30 is provided with a microcomputer, the microcomputer executing a computing operation and a determination operation by means of software, see: col. 9, lines 9-12). Tsuboi further discloses transforming means for transforming the emphasized vibration wave form to frequency domain to form a transformed vibration spectrum, wherein said transformed vibration spectrum has all peaks corresponding to each vibrational order of said object in a limited frequency range, see: col. 11, lines 13-18.

Regarding claims 6 and 15, Tsuboi discloses an analog to digital converter in communication with the microprocessor and configured to convert the signal from a format to another format (A/D conversion means 33, spectrum analyzer 37 and determination unit 30 see; col. 9 lines 23-34 and Fig. 9).

Regarding claims 7-8, Tsuboi discloses FIGS. 5A, 5B, and 5C also show, in an exemplary fashion, a frequency E, between the frequency peaks associated with the first and second order vibrations of the object. In the aforementioned method, the spectrum of the vibration is analyzed. In addition, it is possible to detect whether a defect such as a crack, a dent, or a void is present or absent by applying the windows

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W1 and W2 to the vibration being picked up and then by converting the result into a wave form in time series. In other words, as shown in FIG. 1C, when only a non-through defect such as a void or a dent is present in an object to be measured, the second order spectrum is separated into two peaks, which are a peak 13 of the spectrum of the basic characteristic vibration and a peak 14 of the spectrum of the vibration due to the non-through defect. The sum of the energy (amplitude) of both the spectrums is equal to the energy where the non-through defect is absent. In addition, for the same reason as described above, the spectrum of the vibration due to the non-through defect takes place at a lower frequency than the second order spectrum of the basic characteristic vibration.

Regarding claim 11, as discussed above, it is rejected for the reasons set forth for claim 1. Furthermore, Tsuboi discloses a microprocessor (the computation process and determination unit 30 is provided with a microcomputer, the microcomputer executing a computing operation and a determination operation by means of software, see: col. 9, lines 9-12). Tsuboi further discloses transforming means for transforming the emphasized vibration wave form to frequency domain to form a transformed vibration spectrum, wherein said transformed vibration spectrum has all peaks corresponding to each vibrational order of said object in a limited frequency range, see: col. 11, lines 13-18.

Regarding claims 17 and 23, as discussed above, they are rejected for the reasons set forth for claim 1. Furthermore, Tsuboi discloses window W1 generation means 32 and determination means 38 as shown in Fig. 9.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 21-22 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuboi (US Patent 5,144,838) in view of Savage (US Patent 4,128,011).

Regarding claims 21-22 and 27-28, Tsuboi does not disclose or suggest means for locating a source of vibration, means for sensing the vibration at a plurality of locations and means for triangulating the source of vibration. Savage discloses any anomaly existing in the region of the boreholes will be intercepted by the shear waves as will become apparent from the spectrum of vibration response at varying transmitted vibration frequencies obtained from the sensors such as 32. Once an anomaly has been detected, a technique of triangulation can readily map it in three dimensions, see: col. 9, lines 31-37. It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Tsuboi the techniques of Savage because it would provide means for obtaining the location of both the vibration source and the sensors closer to suspected anomalies by performing effectively the technique of triangulation in a reliable and efficient manner.

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5. Claims 18 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuboi (US Patent 5,144,838) in view of Hernandez (US Patent 5, 511,422).

Regarding claims 18 and 24, Tsuboi does not specifically disclose or suggest a display means. Hernandez shows in Fig. 1 a display 16. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include in Tsuboi the display of Hernandez because one of ordinary skill in the art would recognize the advantages of utilizing a display in the above combination as a common knowledge.

#### ***Allowable Subject Matter***

6. Claims 9-10, 16 and 19-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sabini et al. (US Patent 6,681,634) discloses a bearing defect detection using time synchronous averaging (TSA) of an enveloped accelerometer signal.

McGovern et al. (US Patent 5,955,674) discloses a driveline vibration system diagnostics.

Darrel et al. (US Patent 4,429,578) discloses acoustical defect detection system.

Hagiwara et al. (US Patent 4,525,791) discloses a method and apparatus for reducing vibrations of stationary induction apparatus.

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Sonnichsen et al. (US Patent 6,456,945) discloses detecting anomalies in rotating components.

Radomski (US Patent 6,507,790) discloses an acoustic monitor.

Calkins et al. (US 2003/0088346 A1) discloses a noise, vibration and harshness analyzer.

Piety et al. (US Patent 6,234,021) discloses an enhanced detection of vibration.

Bambara (US Patent 4,843,885) discloses an acoustic detection of bearing defects.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M Saint-Surin whose telephone number is (571) 272-2206. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (703) 305-4705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

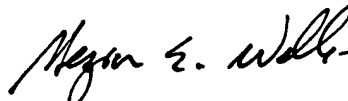


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jacques M. Saint-Surin  
November 27, 2004



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